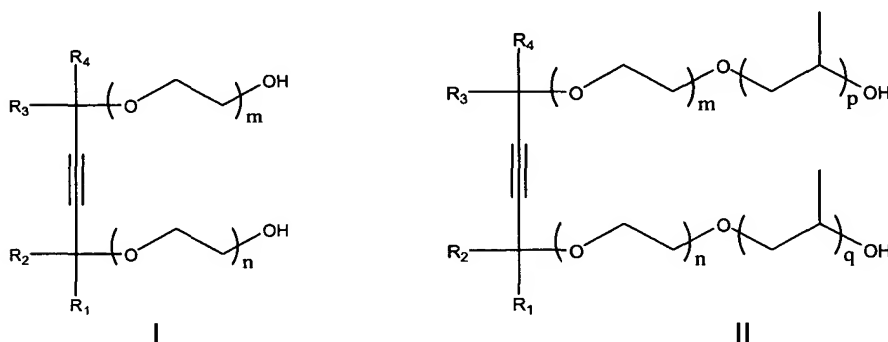


CLAIMS

We claim:

1. A method for improving the wettability of a substrate, the method comprising:

- 5 contacting the substrate with a process solution comprising: a solvent selected from the group consisting of an aqueous solvent, a non-aqueous solvent, and combinations thereof; and about 10 ppm to about 10,000 ppm of at least one surfactant having the formula (I) or (II):



wherein R_1 and R_4 are a straight or a branched alkyl chain having from 3 to 10 carbon atoms; R_2 and R_3 are either H or an alkyl chain having from 1 to 5 carbon atoms; and m , n , p , and q are numbers that range from 0 to 20;

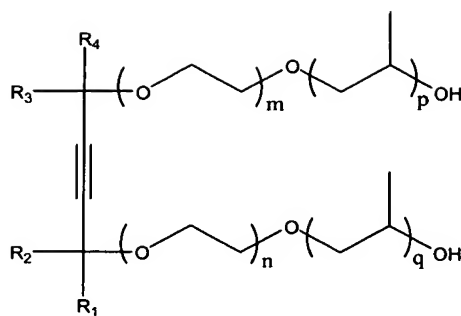
- 15 coating the substrate with a resist coating to provide a resist-coated substrate;

 exposing at least a portion of the resist-coated substrate to a radiation source for a time sufficient to provide a pattern on the resist coating; and

- 20 applying an aqueous developer solution to the substrate to dissolve at least a portion of the resist coating.

2. The method of claim 1 further comprising the step of contacting the resist-coated substrate with the process solution.

3. The method of claim 1 wherein the process solution further comprises from about 10 to about 10,000 ppm of at least one dispersant.
4. The method of claim 3 wherein the at least one dispersant comprises an ionic compound.
- 5 5. The method of claim 3 wherein the at least one dispersant comprises a nonionic compound.
6. The method of claim 1 wherein the value of $(n + m)$ ranges from 0 to 30.
7. The method of claim 6 wherein the value of $(n + m)$ ranges from 1.3 to 15.
8. The method of claim 1 wherein the value of $(p + q)$ ranges from 0 to 30.
- 10 9. The method of claim 8 wherein the value of $(p + q)$ ranges from 1 to 10.
10. The method of claim 1 wherein the process solution is formed prior to the contacting step.
11. The method of claim 1 wherein the process solution is formed during the contacting step.
- 15 12. The method of claim 1 wherein the contacting step is performed before the coating step.
13. The method of claim 1 wherein the contacting step is performed after the coating step.
14. A method for improving the wettability of a substrate, the method comprising:
- 20 contacting a substrate with a process solution comprising a solvent selected from the group consisting of an aqueous solvent, a non-aqueous solvent, and combinations thereof; and about 10 ppm to about 10,000 ppm of at least one surfactant having the formula:



wherein R_1 and R_4 are a straight or a branched alkyl chain having from 3 to 10 carbon atoms; R_2 and R_3 are either H or an alkyl chain having from 1 to 5 carbon atoms; and m , n , p and q are numbers that range from 0 to 20;

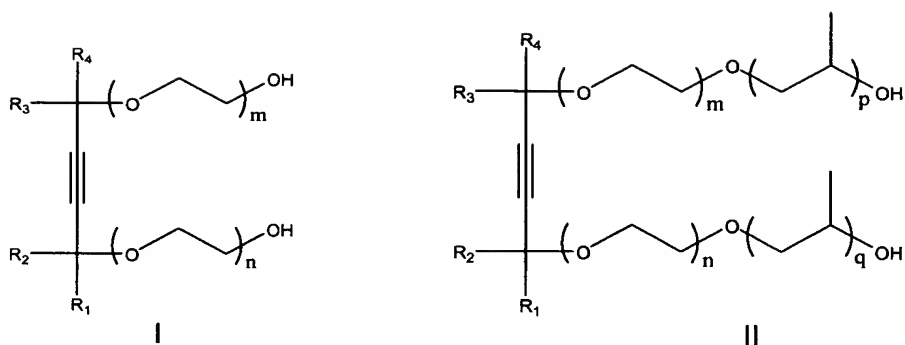
coating the substrate with a resist coating to provide a resist-coated substrate;

exposing at least a portion of the resist-coated substrate to a radiation source for a time sufficient to provide a pattern on the resist coating; and

applying an aqueous developer solution to the substrate to dissolve at least a portion of the resist coating wherein the contacting step is conducted prior to the applying step.

15. A method for improving the wettability of a substrate by reducing a contact angle of an aqueous developer solution on the surface of the substrate, the method comprising:

contacting the substrate with a process solution comprising: a solvent selected from the group consisting of an aqueous solvent, a non-aqueous solvent, and combinations thereof; and about 10 ppm to about 10,000 ppm of at least one surfactant having the formula (I) or (II):



wherein R₁ and R₄ are a straight or a branched alkyl chain having from 3 to 10 carbon atoms; R₂ and R₃ are either H or an alkyl chain having from 1 to 5 carbon atoms; and m, n, p, and q are numbers that range from 0 to 20;

coating the substrate with a resist coating to provide a resist-coated substrate;

exposing at least a portion of the resist-coated substrate to a radiation source for a time sufficient to provide a pattern on the resist coating;

contacting the resist-coated substrate with the process solution; and

applying the aqueous developer solution to the substrate to dissolve at least a portion of the resist coat wherein the first and second contacting steps are conducted prior to the applying step.

16. The method of claim 15 wherein contact angle of the aqueous developer solution on the surface of the resist-coated substrate is about 60° or less at 30 seconds.

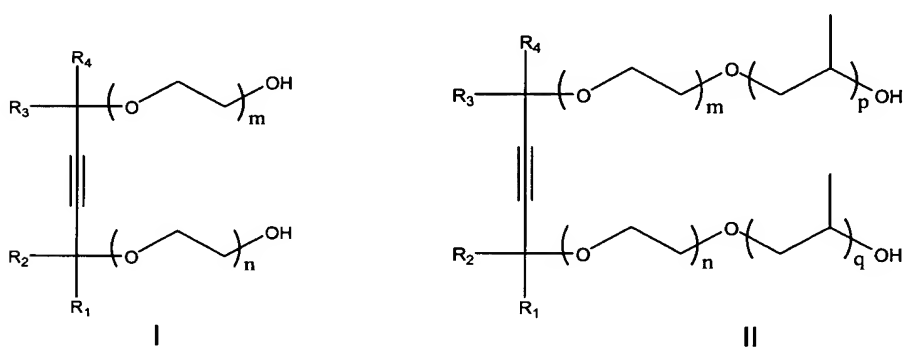
17. The method of claim 16 wherein the contact angle of the aqueous developer solution on the surface of the resist-coated substrate is about 50° or less at 30 seconds.

18. The method of claim 17 wherein the contact angle of the aqueous developer solution on the surface of the resist-coated substrate is about 40° or less at 30 seconds.

19. A process solution, the solution comprising:

5 a solvent selected from the group consisting of an aqueous solvent, a non-aqueous solvent, and combinations thereof; and

about 10 to about 10,000 ppm of at least one surfactant having the formula (I) or (II):



wherein R_1 and R_4 are a straight or a branched alkyl chain having from 3 to 10 carbon atoms; R_2 and R_3 are either H or an alkyl chain having from 1 to 5 carbon atoms; and m , n , p , and q are numbers that range from 0 to 20.

20. The process solution of claim 19 wherein the process solution further comprises from about 10 to about 10,000 ppm of at least one dispersant.

21. The process solution of claim 20 wherein the at least one dispersant comprises an ionic compound.

22. The process solution of claim 20 wherein the at least one dispersant comprises an nonionic compound.

23. The process solution of claim 19 wherein the value of $(n + m)$ ranges from 0 to 30.

24. The process solution of claim 23 wherein the value of $(n + m)$ ranges from 1.3 to 15.

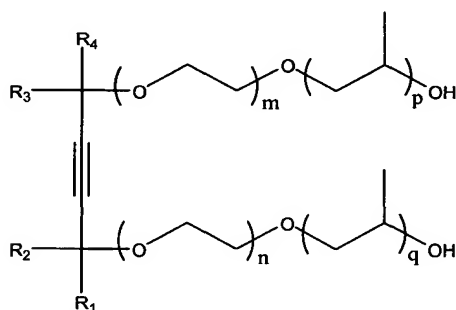
25. The process solution of claim 19 wherein the value of $(p + q)$ ranges from 0 to 30.

5 26. The process solution of claim 25 wherein the value of $(p + q)$ ranges from 1 to 10.

27. A pre-development rinse comprising the process solution of claim 19.

28. A process solution, the solution comprising:

a solvent selected from the group consisting of an aqueous solvent, a
10 non-aqueous solvent, and combinations thereof; and
about 10 to about 10,000 ppm of at least one surfactant having the
formula:

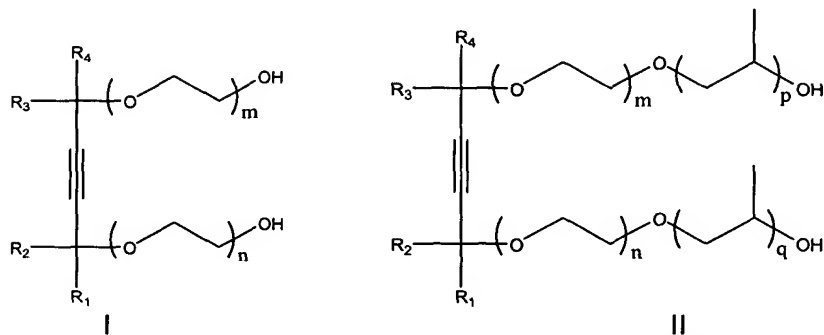


15 wherein R₁ and R₄ are a straight or a branched alkyl chain having from 3 to 10 carbon atoms; R₂ and R₃ are either H or an alkyl chain having from 1 to 5 carbon atoms; and m, n, p, and q are numbers that range from 0 to 20.

29. A method for improving the wettability of an aqueous developer solution on a surface of a resist-coated substrate, the method comprising:

20 providing a process solution comprising: a solvent selected from the group consisting of an aqueous solvent, a non-aqueous solvent, and combinations thereof; and

about 10 ppm to about 10,000 ppm of at least one surfactant having the formula (I) or (II):



- 5 wherein R_1 and R_4 are a straight or a branched alkyl chain having from 3 to 10 carbon atoms; R_2 and R_3 are either H or an alkyl chain having from 1 to 5 carbon atoms; and m , n , p , and q are numbers that range from 0 to 20;

contacting the resist-coated substrate with the aqueous solution; and

applying the aqueous developer solution to the resist-coated substrate wherein

- 10 the contacting step is conducted prior and/or during at least a portion of the applying step.